AN

ADDRESS

DELIVERED ON THE 26TH OF MAY, 1818,

AT THE

Annual Distribution,

BY THE HANDS OF

His Royal Highness the

DUKE OF SUSSEX, &c. &c. PRESIDENT,

OF THE

REWARDS

ADJUDGED BY THE

SOCIETY FOR THE ENCOURAGEMENT OF

ARTS, MANUFACTURES, AND COMMERCE,

BY

ARTHUR AIKIN, F. L. S., COR. ACAD. DIJ.,

SECRETARY.

ADDRESS,

&c.

AMONG the modern Chinese, as among the ancient Egyptians, the principal annual festival is in honour of the souls of their ancestors. The members of each family, repairing to those places in which are deposited the remains of their predecessors, and about which their spirits are deemed still fondly to linger, offer the oblations of their filial gratitude, flowers, and fruits, and rice; and pay those soothing, but unburthensome attentions by which the souls of the departed are supposed to be well pleased.

In somewhat of a similar spirit the members of the Society for the Encouragement of Arts, Manufactures, and Commerce, are on this day assembled to hold their annual commemoration of those worthies to whose meritorious exertions this Institution owes its origin. Their names will ever be held by us in merited respect; and, in obedience to the dictates of natural gratitude, we have made the performance of this duty the introduction to that which is at once the end and crown of our annual labours, the distribution of those honorary and pecuniary rewards which have been voted by the Society in the course of the present Session.

It is now 64 years since Mr. Wm. Shipley, after encountering the difficulties which attend the establishment

of every new institution, arising from the lukewarmness of some, and the extravagantly sanguine expectations of others, succeeded in founding a society, comprehending in its ample range no meaner objects than the encouragement of the Arts, Manufactures, and Commerce, of the British Empire.

The Lords Folkestone and Romney, who at that time wore the hereditary honours of their respective families, contributed their powerful influence and support. The Rev. Dr. Stephen Hales, author of the Treatise on Vegetable Statics, and of various inventions calculated for the benefit of society; Mr. Powel of Brecknock, Dr. Garden of Philadelphia, Sir C. Whitworth, Dr. Russell, and Dr. Franklin were eminently serviceable in various ways, by their personal attendance, by their correspondence, by their zeal in procuring new members, and by the general weight of their characters to the rising institution. Every successive meeting added to the number of subscribers, and in the course of a few years it had associated together eminent persons from every party in the country, who, how much soever they might differ on other points, most cordially concurred in the promotion of a plan, the importance of which admitted of no dispute, and of which the results promised to be so extensively and impartially useful.

A remarkable difference between the literary and scientific institutions of England, when compared with those of the continent of Europe, is, that the former have arisen from, and have continued to be supported by, the voluntary exertions of individuals, liberal of their time, their talents, and their money, for the public good; whereas the latter have been, for the most part, produced under the fostering influence of their respective governments, and

continue to derive from the state most of the funds necessary for their support. Hence the latter may be, and, in some instances no doubt are, the result only of a wise and liberal feeling in the sovereign or his ministers, and the situations of honour or of emolument attached to them, falling necessarily under the patronage of the government, are bestowed too often for reasons but slightly connected with the ostensible objects of such institutions. In this country, on the other hand, most of our establishments for the communication of knowledge, general, professional, and scientific, are the result of voluntary effort, and depend for their pecuniary resources almost wholly on the annual subscriptions of their members. Hence they cannot well arise before the public mind is sufficiently enlightened to afford them an effectual support; and the necessary condition of their very existence is unwearied and well-directed exertion. In proportion as the zeal of the members becomes languid, as they fall into favouritism or misemploy their funds, their subscriptions decline, and are soon absorbed by some other society more wisely or more actively zealous. Such being the state of scientific institutions in this country, that society whose constitution is the most liberal, and which therefore can incline itself, with the most vigorous pliability, to the ever-varying circumstances induced by the temper of the public mind, and the continually-accelerating progress of knowledge, stands the fairest chance for durable prosperity.

It is therefore no light obligation that we owe to the wisdom of the founders of this Institution, who, in proposing to themselves and to their successors so vast a range as the commerce, the arts, the agriculture, and the manufactures of the country, forbore to circumscribe it within the bounds even of the most liberal charter that the munificence of the sovereign could bestow. Innu-

merable are the occasions in a Society so numerous and therefore so miscellaneous as this, in which differences of opinion arise, that, under the management of a close corporation, might soon degenerate into that most acrimonious form of party controversy, in which measures proposed are estimated, not by their intrinsic fitness or advantage, but by the party connexions of the individuals who support them. From this most deadly bane, we have hitherto escaped by the salutary practice of making every measure originate in the general body of the Society, and of referring to the same body, for final confirmation, every report of every committee. The constitution of our committees, also, which are open to each member of the Society, gives an additional security for the equity and justice of our proceedings. Those subjects which are generally the most interesting, of course induce the fullest attendance; the quantity or species of which varies according to the nature of the subject under consideration. A proposed improvement in Time-keepers, for example, insures to us the voluntary attendance of a greater or less proportion of those ingenious artists in this department who belong to the Society: some may attend from curiosity, some from the hope of obtaining useful information, some from a spirit of rivalry, some from a desire that the reputation of the Institution of which they form a part, may not be committed by rewarding what is worthless or well known, or by rejecting a valuable and original invention. Whatever be the motive, a sufficient number of competent judges is thus assembled, whose opinions will necessarily and properly exert a due influence over the rest of the Committee. An improvement in Mill Work, in the Steam Engine, in the Printing Press, in the Life-boat, in the Theodolite, will, in like manner, secure to us the attendance of those who are the best qualified to lead the opinions of the rest on these particular subjects; the general result of

which is, that each committee is sufficiently and appropriately filled by the mere spontaneous attendance of those who are the most interested in the particular subject of discussion, without imposing the necessity of attendance on any one, except the chairman; and, there being two of these officers to every committee, it rarely indeed happens that one at least is not in readiness to preside.

There are three circumstances which may safely be assumed as indicative of the state of a Society, whether it is advancing, is become stationary, or has begun to decline. These are, the number of its efficient members, the degree of attendance on the committees and meetings of the Society, and the quantity and importance of the subjects which are offered for reward. In all these particulars, I am happy in having it in my power thus publicly to declare, that the situation of this Society is highly satisfactory.

Two hundred new members have been inscribed on our books since the last anniversary. In the mean time we have lost some by death, and probably others by removal of residence and change of circumstances, the number of whom cannot be accurately ascertained: after, however, the most liberal deductions have been made on these accounts, there will remain a clear and considerable increase on the whole.

The necessity which has occurred during the present Session of providing additional accommodation in our hall of meeting, and complaints, well-founded and often repeated, of the thronged state of our committee room, are sufficient evidence of the zealous and assiduous attendance of the members. Nor is this the result of occasional and casual curiosity, since the weekly issue of notices of committees to the members alone, which some

years ago scarcely amounted to 50, falls now very little short of 200.

With regard to the value of the communications in recompense of which the rewards of the Society are this day about to be conferred, it may seem invidious to compare them with those of former years; yet I cannot avoid stating, that that volume will not be found the least important of the Society's Transactions, which shall contain the details of Mr. Bradshaw's successful and spirited culture of Peat Moss; of Mr. Bowden's method of preventing and curing the Dry Rot in Ship Timber; of Lieut. Shuldham's method of Ballasting Swift Sailing Vessels; and of Mr. Clement's beautiful Machine for describing Ellipses; not to mention the effectual aid offered to the seamen in the accidents and perils to which his occupation exposes him, by the Life Preserver of Mr. Grant, and the Night Life Buoy of Mr. Cook.

Without ascribing to the efforts of this Society a greater influence on the public welfare than they fairly deserve, it is, however, gratifying to reflect that the time of its duration is strictly coincident with that in the course of which all those vast discoveries in the mechanical, chemical, and agricultural arts have arisen, by which the present generation is so eminently distinguished from all preceding ones. To lay before you in detail, and in all their bearings on each other, this immense accumulation of knowledge and of power, is a subject too extensive for our prescribed time, and far too weighty for the abilities of him who has now the honour of addressing you; yet I cannot prevail on myself wholly to forego the attempt to offer to your notice some sketch, however slight, of the principal obligations which we owe to our immediate predecessors, some of whom still linger on the western horizon

of life, that we may hence be inspired with the honourable ambition of proving ourselves the worthy descendants of those who have multiplied to so vast an extent the resources of human ingenuity.

When the civil commotions and foreign wars which for sixty years had agitated the whole British nation, were finally settled by the result of the insurrection of 1745; and the present Royal Family, after an arduous struggle, was at length firmly established on the throne, the minds of men naturally began to turn themselves to those arts of peace which the uncertainty of public affairs, and the more stimulant interest of political party, had consigned to a long neglect.

The situation of the country with respect to the arts, the manufactures, and all those things in which the public wealth of the community consists, was at that time considerably inferior to that of Holland, the Netherlands, France, and some of the Italian states.

The internal communication between one place and another, was carried on partly by circuitous coasting voyages, partly by rivers obstructed by shoals during the Summer season, and swelled into formidable torrents by the Winter rains, and partly by roads, so ill constructed, and in such a state of neglect, that the cheapest and most expeditious way of transporting commodities along them, was on the backs of pack-horses.

A considerable proportion of the entire surface of the land was occupied by uncultivated wastes; the drainage of the fens of Cambridgeshire, Lincolnshire, Huntingdonshire, and Norfolk, as well as those of Somerset and Gloucestershire, at no former period very perfect, had

fallen at this time into great decay. The system of agriculture was rude and wasteful, and no attention had been paid to improving our breeds of domestic animals, except of the horse.

A large proportion of our manufactures were literally so, being made by hand: the only first movers of the common machinery which we possessed were, the elements of water and of wind, and the living strength of men and of animals, excepting in a few places where the Steam Engine of Savary and of Newcomen, a machine of rude and imperfect construction, and of little power, was employed in raising water.

The smelting and conversion of the ores of iron and of our other metals was performed almost wholly by means of charcoal, by which not only was their cost enhanced, but the quantity produced was very limited, in consequence of the diminished extent and impoverishment of our woods and forests.

No manufacture of pottery, but of the very coarsest kind, existed: vessels of wood, of pewter, and even of leather, formed the principal part of the household and table utensils of genteel and opulent families; our porcelain was imported from China and Japan, from Dresden and Paris; and was an article rather of luxury than of convenience.

The principal part of our linen was from the looms of Germany and Holland, and of our silks, from those of Italy and France. A few of the coarser articles of cotton, such as fustians, had begun to be manufactured in the neighbourhood of Manchester: but chintzes, muslins, and all the other articles of finer fabric were brought hither

from India. It is unnecessary to particularize objects of inferior importance and more restricted application, since the same general observations hold equally good with regard to them as to the others.

Foremost in time, and probably not inferior to any in the degree in which he has contributed to the national prosperity, may be placed the late Duke of Bridgewater. A brook which falls into the Mersey between Warrington and Liverpool, had been rendered navigable for a few miles, by deepening the channel, by cutting across the most excursive of its windings, and by erecting at its mouth a flood gate, for the purpose of retaining the tide water. The hint thus offered was soon appropriated and improved by the penetration and genius of his Grace, who, in the year 1757, commenced the execution of a canal for the purpose of conveying coals from his estate at Worsley to the town of Manchester. The subterranean termination of this work in the very heart of the colliery affords the first example of tunneling as applied to navigable canals; and the success which attended the whole undertaking, induced his Grace some time after to project a much larger and more difficult work, the canal which now bears his name. Its purpose was, to open a regular and easy communication between the towns of Manchester and Liverpool, the river Mersey, which before connected them, offering too uncertain and circuitous a road for the proper accommodation of the increasing traffic; and the land carriage, though direct, being too expensive for bulky and heavy articles. By the original genius of Brindley, his engineer, whose magnificence of plan, and fertility in resources, now found a patron entirely worthy of him, this great plan was at length completed, and thus opened the way to that system of internal navigation, the various trunks of which, communicating with each

other, like the blood-vessels of the animal body, carry life and vigour wherever they extend. The mineral treasures of coal and of limestone, which are found so exuberantly in certain districts, while they are entirely wanting in others, now began to extend their benefits to a wider range of country, offering, in the one, to the distant landholder, the most efficacious of manures at an easy price, and in the other, to the public at large the most indispensable of the comforts of life. The high roads were benefitted to an incalculable degree, by withdrawing from them the transit of the most ponderous articles, and thus rendering their improvement, what it was not before, a practicable undertaking. The manufactures which occasion the greatest consumption of fuel, and require the cheapest carriage, those, namely, of iron, of glass, and of pottery, soon established themselves on these our inland ports, peopling many a wild, till then almost destitute of human habitation.

The same district which had been the first to benefit by canal navigation, was also destined to be the principal seat of that manufacture which, in the course of half a century, has become the staple article of British commerce, and in which the continent of Europe is now running with us the most animated race of rivalry, I mean the production of all those articles of dress and furniture, of luxury, and of use, of which cotton is the raw material.

Early in the last century, the muslins, the chintzes, and other delicate cotton fabrics imported into this country from the East Indies, had begun, in some degree, to supersede the fine linen of Flanders, and the silks of Italy. The cultivation of the cotton plant had been introduced with success into our American and West Indian colonies;

it was raised at a small comparative expense of labour; its produce was abundant, and might, on short notice, be multiplied almost to an indefinite extent. The port of Liverpool, by means of its intimate commercial connexions with America and the West Indies, received a large proportion of the consignments of this commodity, which was disposed of for manufacture chiefly in the neighbourhood of Manchester. After being cleaned, carded, and spun entirely by the manual labour of women and children, the yarn was transferred to the weaver, and made by him, for the most part, into light but substantial articles of clothing. The most tedious part of the process was drawing out the thread, in which no instrument except the common spinning-wheel was employed; the yarn, also, thus produced, bore no comparison in fineness to that which was drawn out by the delicate and flexible fingers of the Hindoo women, so that to attempt to increase the produce, or to improve the quality of the manufacture, and thus enter into competition, even in the home market, with the Indian fabrics, appeared a hopeless undertaking, unless some material improvement could be introduced in the spinning process. Strongly impressed with this conviction, the Society of Arts, as early as the year 1760, offered premiums for a machine capable of spinning six threads at once, and requiring the attendance of only one person. In 1764 some imperfect machines for this purpose were rewarded by this Society, and in the very same year a common weaver, of the name of Hargreaves, constructed one which spun eleven threads. The line of improvement being once pointed out, ingenious men from all quarters rushed into it; one invention prompted another, and the splendid fortunes which were the reward, even of moderate talent, attracted to this branch of industry so large a proportion of enterprise and ability, that the cottons of Manchester and Glasgow now find purchasers, not only in every

corner of Europe and America, but are even forcing their way in the very markets of China and of Hindostan.

When Mr. Watt was once asked by a foreigner in what commodity he dealt, he replied in *Power:* and of all human inventions the steam engine is certainly the most powerful auxiliary that has yet been brought in aid of the strength of man. To the discovery by Dr. Black of the theory of latent heat in 1764, are we indebted for the abstract principle, and to Mr. Watt for the particular application of this principle to the construction of a moving power, capable of acting in any situation, and of condensing, in one spot, the greatest possible quantity of momentum.

The force of wind is irregular and intermitting; that produced by the descent of water is, from its very nature, restricted to comparatively few places; that originating in the live power of men or other animals cannot be accumulated beyond a certain amount in a single effort, or be continued without long intervals of rest. The steam-engine, on the other hand, is not obnoxious to any of these objections; it is uniform in its force, constant in its action, may be erected in any situation, and may be constructed so as to produce a combination of power and of celerity quite unrivalled. It would be wholly superfluous to attempt to particularize the various purposes to which this admirable machine is now applied, whether to give motion to the almost infinite complication of parts composing a cotton factory, or like some mighty giant to wield the ponderous hammer of an iron forge, or draw up a river from the lowest depths to which the courage and perseverance of the miner have yet penetrated. The familiar and almost domestic uses to which it has of late been made subservient, have somewhat detracted from the

sublimity of this magnificent invention; but whoever duly considers either the knowledge and profound combination required in its original construction and successive improvements, or the mighty effects of which it is the immediate cause, will be satisfied of the justice of placing the name of its inventor among the worthies of Britain.

Of those of the last age who yet claim to be held up as examples to the present for meritorious discoveries which have contributed to the high advancement in arts and manufactures for which our native country is so honourably distinguished, the present occasion will only allow me time to select one other name, that of the late Abraham Darby, of Coalbrook Dale. Of this celebrated seat of the iron manufacture, Mr. Darby was the author, by establishing here the first furnace that was ever constructed for the reduction of iron ore by means of coak. An invention which reserved our plantations and forests to better uses than the production of charcoal, which gave up to tillage and pasture many a fertile tract of comparatively unproductive woodland, and especially which, by lowering the price, and facilitating the production of the most useful of all the metals, led the way to that extensive employment of it which is one of the distinguishing characters of the present time. In more senses than one indeed he may be said to have led the way. The iron bridge which spans the Severn at Coalbrook Dale, with an arch above 100 feet wide, was his plan and his construction. Although the first of the kind ever erected, it possesses a character of simple grandeur which has not often been equalled since. Mr. Darby was also, I believe, the inventor of the iron rail way, many miles of which were laid down to facilitate the communication between the various mines, collieries, quarries and smelting works, of the vast establishment of which he was the active head.

I find his name on the books of this Society more than 40 years ago, and we owe to his liberality the fine model of his bridge, which adorns our Repository.

Want of time, not of inclination, prevents me from proceeding farther in the grateful office of recalling to your memories the names of those who, by improvement and discoveries in the useful and ornamental arts, have contributed to the sum of private happiness and of national prosperity.

On some future occasion I may, perhaps, have an opportunity of pursuing the interesting subject; at present I must give place to the more direct business of the day, namely, the distribution, by H. R. H. the President, of the medals and pecuniary gratifications awarded by the Society in the course of the Session.